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MANAGEMENT OF AN EROSION CONTROL SYSTEM

(Revision of Factsheet "Management of An Erosion Control System", May 1985)

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This factsheet discusses many methods to assist you, the landowner, in managing your investment in an erosion control system. The management should start with the choosing of a system and not end until the system is deemed unnecessary or is replaced by another.

CHOOSING A TYPE OF EROSION CONTROL SYSTEM

Initially, you should realize two things: (1) that you have an erosion problem; and (2) that you want it controlled. Next, you should determine how and where to control the problem . In some cases , work will be required right at the erosion site, however in other cases, the solution needs to be located elsewhere in the watershed.

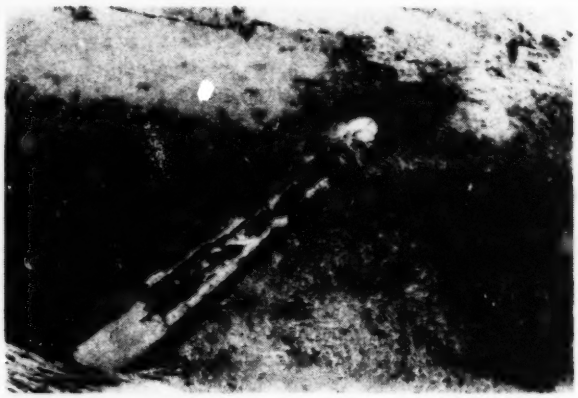

Figure 1. Tile exposed by erosion in a watercourse

Any assistance is often very valuable at this point. Often information and technical assistance can be obtained from the field office of the Ontario Ministry of Agriculture and Food or Conservation Authority. You may find that the solution to the sheet erosion occurring on your farm may be as simple as eliminating fall plowing or incorporating more rotations into your farming operation. However, on the other hand, the solution may require the construction of a complex control system such as terraces and may involve the cooperation of other landowners.

COMPLETING NECESSARY LEGAL AND FINANCIAL STEPS

Once you have chosen the best type of control system, you should look at the legal and financial aspects. This should be completed before the final planning of the particular control system takes place.

Often the control system depends on the involvement of a neighbor(s). Neighbor(s) should be approached and his (her) point of view on the subject should be obtained. If agreement is reached, then it should be written down to prevent future misunderstandings. A Mutual Agreement under The Drainage Act is a means to complete the written agreement. If agreement is not reached, then an alternative control system or method of approach should be considered.

Legal aspects such as proper outlet of tiles should also be considered. Refer to the Factsheet, "Drainage Legislation", Order No 89-166 and "Common Law Aspects of Water, " Order No. 74-058 for further information.

At this stage, any grants or other incentives should be investigated. With most incentives, it is necessary to submit a proposal before construction commences. The incentive often will specify the type of structure or professional assistance required.

PLANNING THE SYSTEM

Once the above steps are complete, the final planning can proceed. On a simple project requiring the change of a cropping practice, a visit to a demonstration project or the reading of background information may be all that you will require to undertake a project.

However, a more complex project may require information such as the accurate determination of the peak flow and the complete design of an erosion control structure. Assistance by a consultant familiar with hydrology and the planning of erosion control structures will be required.

CONSTRUCTING THE PROJECT

Once plans are completed, the actual work can start. Sometimes a simple project can be completed by the landowner, however, most often specialized equipment, materials and expertise are required. A qualified contractor is hired using a combination of economics, experience, timeliness and reliability as the hiring criteria. Sometimes personnel from a local Conservation Authority will work as the contractor and hire sub-contractors to assist them.

Once the work is initiated, you and other personnel involved with the planning of the project should frequently inspect the on-going work to ensure that construction is being completed according to plan. Also, unforeseen problems encountered during construction can be dealt with.

The construction of the project is not complete until all the steps are finished. This includes the seeding of areas to be grassed and the installation of emergency spillways. Visible markers should be installed if the project is a potential hazard to the operation of farm equipment.

MAINTENANCE OF A PROJECT

Erosion control projects are very vulnerable to poor maintenance. A continuing maintenance package should be organized for every project. Maintenance requirements depend on the type of project.

(1) Systems with permanent vegetated areas

All bare or eroded areas should be repaired and reseeded as soon as possible. Undesirable species of vegetation should be removed or controlled to prevent damage to the essential vegetation. Most vegetated areas designed to flow water should be mowed at least twice per year. The mowing prevents the channel from becoming too restrictive to water flow, and it encourages a thick erosion resistant stand.

All vegetated buffer strips should be maintained. The planting of trees in the buffer strip prevents accidental tillage.

Accidental spraying either by direct contact or runoff can destroy a vegetated area especially in the establishment stages. All spray operators should be warned of this vulnerability.

(2) Systems Utilizing Drop Pipe Inlet Spillways

Excessive shifting, settlement or heaving of the structures should be monitored. It is an indication of potential problems. Inspection for pipe separation, breakage or crushing should take place after every major runoff event. A small internal hole can initiate water channeling along the pipe.

Watch for erosion below the outlet of the spillway. This erosion can eventually undermine the outlet pipe. It should be repaired and an erosion resistant lining installed if the problem persists.

Erosion at the inlet to the structure is also troublesome. It is caused by swirling and excessive velocities of water at the inlet. The swirling can be reduced by installing an anti-vortex device in the drop pipe and the velocity problem can be solved by reducing the slope in front of the inlet or by building an erosion resistant lining around the inlet. Plugging at the inlet must be avoided. After each usage any debris should be removed. If the debris presents a continual problem, the inlet grate should be changed to increase the entrance area, reduce the restriction or decrease the velocity of the water across the grate.

(3) Systems which incorporate berms

Any movement or shifting of the berm must be stopped. Normally the movement is caused by an unstable back slope. The stability of the slope must be improved. The movement can also be caused by improper cultivation of a tilled berm. Any rodent damage to the berm should be repaired and stopped. A hole through the berm at ground level can result in immediate failure.In extreme cases, a rodent proof screen or barrier will have to be installed into the berm. Mowing of the grass cover may be required to maintain a good stand and keep weeds under control.

(4) Systems which use Emergency Spillways

Always make sure that the lowest point in the emergency spillway is below the crest elevation of the berm. A level instrument is needed to verify this. Many spillways have adequate protection only at the inlet area resulting in erosion if the spillway is under heavy usage. This erosion will have to be repaired to prevent further erosion during the next usage period. If repair is frequently necessary, an improved emergency spillway system will be required or the main spillway system will need to be increased in capacity .

Some systems such as terraces, use the vegetated flat top of the earth berm as the spillway. With this system, it is essential that the berm top is level to spread out the overflow water and keep the velocities and eroding effects of the water to a minimum.

(5) Systems Utilizing Chute Spillways or Other Soil Linings

Failure of this type of system is often caused by water finding a path around or under the structure. Look for base erosion caused by this water. Uneven settlement of blocks or riprap will indicate a problem. If found in an early stage a cutoff wall can be installed at the inlet to the structure.

During high flow rates on a rock chute or riprap lining, some movement of the rocks can be anticipated. Normally a "bank" of rocks on the top end of the structure will refill the voids. Periodically rocks will have to be added to this "bank". If this is frequently necessary, improvements to the complete structure should take place.

Figure 2. Partial failure of a rock chute

(6) Silting Problems

Many erosion projects (esp. grassed waterways and floodwater storage systems) can fill up with accumulated silt. This silt will reduce the capacity of the structure. Removal of the silt or an increase of the structure size will then be necessary.

The more desirable solution is to reduce the movement of silt into the structure. This is done by improving conditions upstream which may involve a change of tillage practices or installation of a terrace system.

ASSISTANCE

Qualified erosion control contractors and consulting engineers are available for the design and construction of erosion control structures. Conservation Authorities may offer technical assistance and construction supervision in some areas of the province. Other erosion control factsheets and information are available at the local offices of the Ontario Ministry of Agriculture and Food.

All erosion control projects must comply with existing legislation, i.e., Lakes and Rivers Improvement Act, Fisheries Act, etc.

Financial assistance may be available from the Ontario Ministry of Agriculture and Food or other government agencies. Make sure that all necessary criteria of the grant are satisfied both before and during construction.

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